Oct. 9, 1928.

1,686,881

R. J. STEPHENSON

ROOF FLASHING

Filed March 17, 1927

Fig. 1.

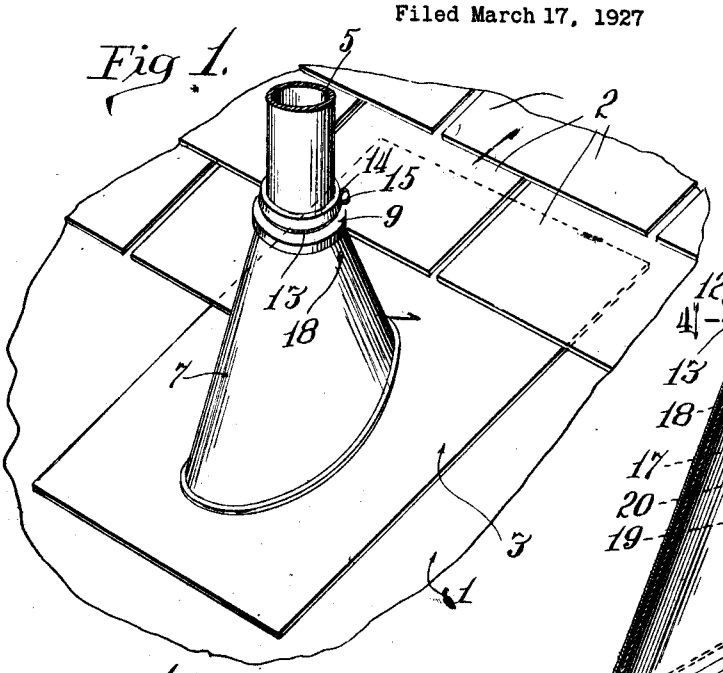



Fig. 2.

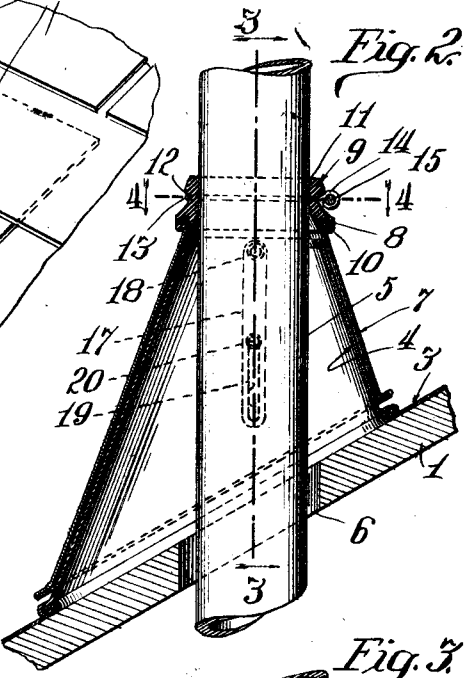



Fig. 4.

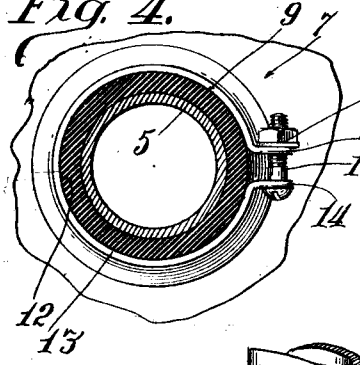



Fig. 5

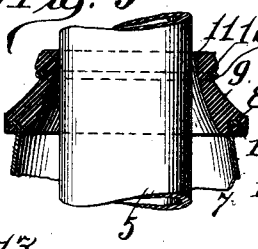



Fig. 3.

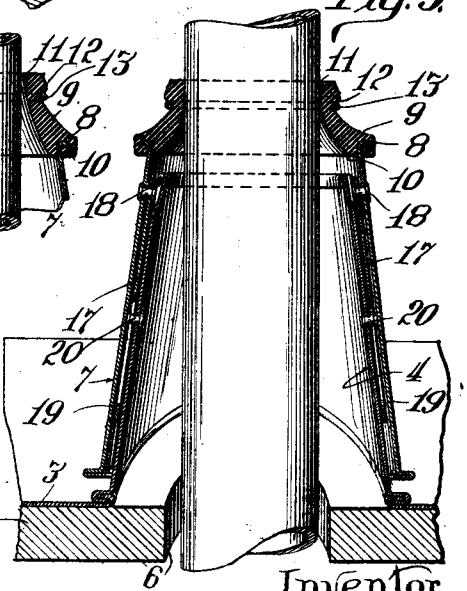
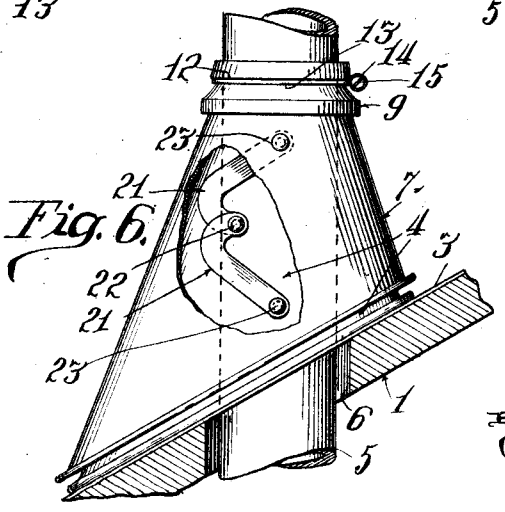



Fig. 6.




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# UNITED STATES PATENT OFFICE.

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## ROOF FLASHING.

Application filed March 17, 1927. Serial No. 176,047.

This invention relates to roof flashings, adapted to maintain water-tight joints between a roof and a pipe, for example, a ventilating pipe, projecting upwardly therethrough.

Such devices commonly comprise a flat base plate which is anchored in or about the roof materials, and a sleeve member projecting upwardly from the base, the free end of the sleeve snugly surrounding the pipe and being calked or otherwise secured thereto to maintain a tight joint. The pipe is usually supported from below, independently of the roof, and if the roof should settle an appreciable amount, as it often does in time, or tilt slightly in one direction or another, the joint between the sleeve and the pipe will be broken away and leakage will occur.

One object of the present invention is to provide an improved roof flashing which will permit limited relative movements in various directions between the roof and pipe without disturbing the joints between the flashing and the pipe or between the flashing and the roof. This is accomplished by providing two similar telescoping flashing sleeves, one of which is secured to the pipe and the other to the roof, the two sleeves being capable of limited relative movements in various directions. Due to the long overlap between these two sleeves, no water can flow between these sleeves, although they may be drawn apart at one point or another to permit the relative movements to take place,

Another object is to provide improved means for preventing complete disconnection of the main and counter-flashings without interfering with the limited relative movements between these two members.

Another object is to provide an improved soft metal collar at the free end of the flashing, and means for bringing this collar into snug water-tight engagement with the pipe.

Other objects and advantages of this invention will be apparent from the following detailed description of certain approved forms of the device.

In the accompanying drawings:

Fig. 1 is a perspective view of the improved roof flashing in use.

Fig. 2 is a central vertical section through the assembly as shown in Fig. 1.

Fig. 3 is a central vertical section taken at right angles to Fig. 2, and substantially on the line 3—3 of Fig. 2.

Fig. 4 is a horizontal section, on a somewhat larger scale, taken substantially on the line 4—4 of Fig. 2.

Fig. 5 is a detail view showing the soft metal collar in its original form, before it is clamped against the pipe and moved to the position shown in Fig. 3.

Fig. 6 is a vertical elevation, partially broken away, showing a modified form of means for preventing disconnection of the sleeves.

In Figs. 1, 2, 3 and 6 is shown a portion of a roof 1, having a covering, such as shingles 2, for excluding water. As indicated, a portion of the shingle covering 2 has been removed to disclose the base plate 3 of the roof flashing, which base plate will ordinarily be anchored between the roof 1 and the shingles 2. Obviously, any other type of roof covering might be used instead of the shingles. The base 3 is preferably formed of a rectangular sheet of metal, for example copper, having a central opening from which projects the tapered flashing sleeve 4 which surrounds the pipe 5. The pipe 5 projects substantially vertically through an opening 6 in the roof 1, and it is the purpose of this roof flashing to prevent the entrance of water or similar substances through the opening 6 in the roof. The flashing sleeve 4 is preferably of a frusto-conical form, having a substantially elliptical cross-section, and projecting at an angle to the perpendicular from the base plate 3, so that the center line of the conical sleeve will substantially coincide with the vertical center line of the pipe 5, while at the same time the base plate 3 will lie in an inclined plane corresponding to the inclination of the roof 1. Preferably this main flashing sleeve 4 is made of a separate piece of sheet metal, the larger end of the sleeve being secured about the edges of a correspondingly shaped opening in the base plate 3, preferably by crimping the edges of the two metal parts together and soldering same. The upper end of the sleeve 4 is large enough to extend loosely about the pipe 5, as shown in the drawings.

A similarly shaped sleeve or counter-flashing 7 is adapted to fit snugly over the main flashing sleeve 4, so that when the two sleeves are completely telescoped, the lower edge of sleeve 7 will extend closely adjacent the base

plate 3. The upper smaller end of the sleeve 7 is preferably curved or flanged outwardly, as indicated at 8, and is anchored to or within the soft metal clamping collar 9.

The soft metal collar 9, preferably formed of lead, is in the form of a continuous ring which tapers inwardly from a larger lower end 10, in which the crimped end of sleeve 7 is cast or otherwise embedded to a smaller upper end 11, having an internal diameter sufficient to loosely engage about the pipe 5. The collar 9 is reduced intermediately to form an annular groove 12 for receiving the wire clamping ring 13. Ring 13 is split and has its ends looped, as indicated at 14, to receive the screw bolt 15. By tightening a nut 16 on one end of this bolt (or screwing the bolt 15 into the nut 16), the ends 14 of the split ring 13 will be drawn together so as to decrease the diameter of this clamping ring. The original form of soft metal collar 9, before it is clamped to the pipe 5, is indicated in Fig. 5.

After the pipe 5 is slipped through the collar 9, and the parts are brought to the desired relative positions, the bolt 15 is tightened so as to contract the clamping ring 13 and deform the soft metal collar 9 so that its upper portion is drawn into snug engagement with the pipe, as indicated in Figs. 2, 3 and 4. The upper edge of the collar 9 is then calked against the pipe, and a final tightening of the bolt 15 insures a watertight joint.

It is apparent that the outer sleeve 7 may be lifted from its position of close engagement about the inner sleeve 4, so as to permit longitudinal separation of the pipe-engaging collar 9 and the base plate 3, and this movement will create a clear space between the two sleeves which will permit lateral movement in any direction with relation to sleeve 4, or will also permit this outer sleeve to be tilted in any direction to a limited extent with relation to the inner sleeve 4. Thus, within certain limits, all movements of the pipe 5 with relation to the roof 1, may be accommodated without disturbing the engagement between the collar 9 and pipe 5, or the base plate 3 and roof 1. Means is preferably provided to permit these relative movements between the two flashing sleeves, without permitting their complete separation. In the example shown in Figs. 2 and 3, a link 17 is pivoted at its upper end on a stud or rivet 18 mounted in the outer sleeve 7. The lower portion of link 17 is slotted, as shown at 19, to slidably engage a stud or rivet 20, which is secured in the inner sleeve 4. The stud 20 will slide in the slot 19 to permit limited longitudinal separation of the two sleeves, and the link 17 will flex, or will swing about its pivot 18 to accommodate the relative lateral movements of the two sleeves. As indicated in Fig. 3, a pair of these slidable link connections are used at diametrically opposite positions between the two sleeves. Obviously, the positioning of the link 17 might be reversed end for end, or it might be secured to the inner sleeve instead of to the outer sleeve.

A different form of connecting means for limiting the relative movements of the sleeves is shown in Fig. 6. In this modification a pair of similar flexible links 21 are pivoted together at one end 22, and their other ends are pivoted at 23 to the sleeves 4 and 7, respectively. The sleeves may be separated until the intermediate pivotal connection 22 is brought in line with the two end connections 23. If rivets are used extending through the outer sleeve 7, as shown at 18 or 23, the outer ends are preferably soldered over to prevent leakage at this point.

When the device is positioned for service, the base plate 3 is anchored to the roof 1, and the collar 9 is clamped and calked permanently to the pipe 5. If now, the roof 1 should settle with respect to the pipe 5, carrying down with it the base plate 3 of the flashing, this will not break loose the joint between the collar 9 and the pipe 5, but the sleeves 4 and 7 will simply separate to the extent necessary to permit this relative separation of the base plate and the clamping collar. Any relative tilting movements, or lateral movements, between the roof 1 and pipe 5 will be accommodated in a similar manner. While each flashing is designed for use on a roof of a given inclination to the vertical, this flashing is adapted for use on roofs which vary considerably from this standard inclination, since the angle of the pipe 5 within the deformable soft metal collar 9 may be varied to some extent, and also by separating the sleeves 4 and 7, they may be relatively tilted to accommodate a considerable angular displacement of the base plate 3 with relation to the center line of the pipe 5. It will be evident that the long overlap provided between the main flashing and the counter-flashing insures complete protection against the entrance of liquids, even though considerable settling or displacement has taken place between the roof and pipe.

I claim:

1. A roof flashing comprising a base in the form of a flat metal plate having an extensible sleeve consisting of two overlapping sleeve sections, extending from one face thereof, connecting means between the sleeve sections for limiting their separation, a continuous inwardly tapering soft metal collar at the free end of the sleeve, and contractible means surrounding the soft metal collar and adapted to deform the collar and draw it into snug engagement with a pipe.

2. A roof flashing comprising a base in the form of a flat metal plate having an exten-

sible sleeve consisting of two overlapping sleeve sections, extending from one face thereof, a continuous soft metal collar at the free end of the sleeve, the collar having an annular groove formed in its outer surface, a split wire ring mounted in the groove, the ring having spaced looped ends, and a screw-bolt connecting the loops and adapted to contract the ring and deform the collar to draw it into snug engagement with a pipe.

3. A roof flashing comprising a flat metal plate having a sleeve projecting from one face thereof, a second similar sleeve into which the first sleeve telescopes, a soft metal collar at the outer end of the second sleeve for engaging about a pipe, and extensible link connections between the sleeves and secured thereto for limiting their separation.

4. A roof flashing comprising a flat metal plate having a sleeve projecting from one face thereof, a second similar sleeve into which the first sleeve telescopes, a soft metal collar at the outer end of the second sleeve for engaging about a pipe, a slotted link between the sleeves and secured to one sleeve, and a stud on the other sleeve engaging in the slot in the link to limit the separation of the sleeves.

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